



# CLOUDS

## What Are They?

by Mel Friedman    illustrated by Christina Wald



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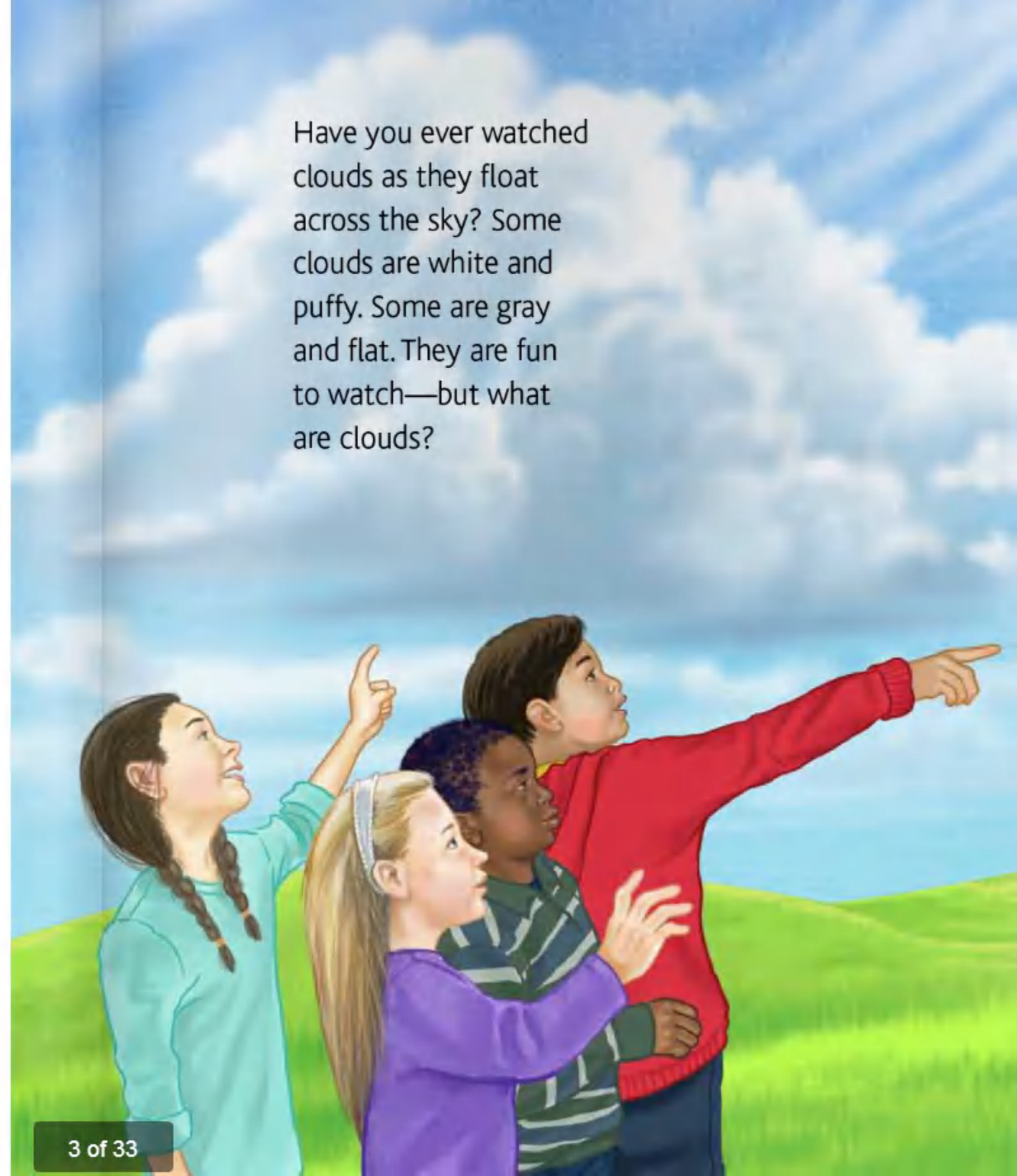
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Have you ever watched clouds as they float across the sky? Some clouds are white and puffy. Some are gray and flat. They are fun to watch—but what are clouds?

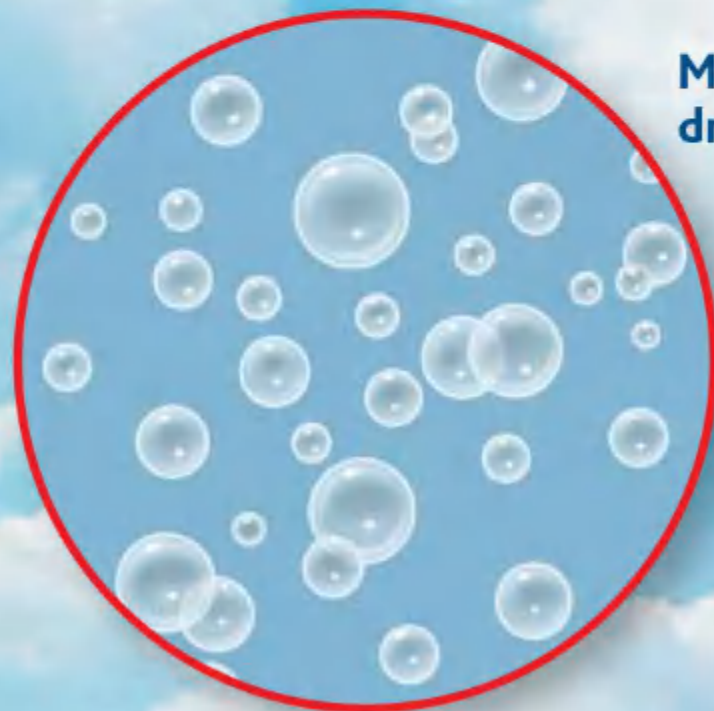




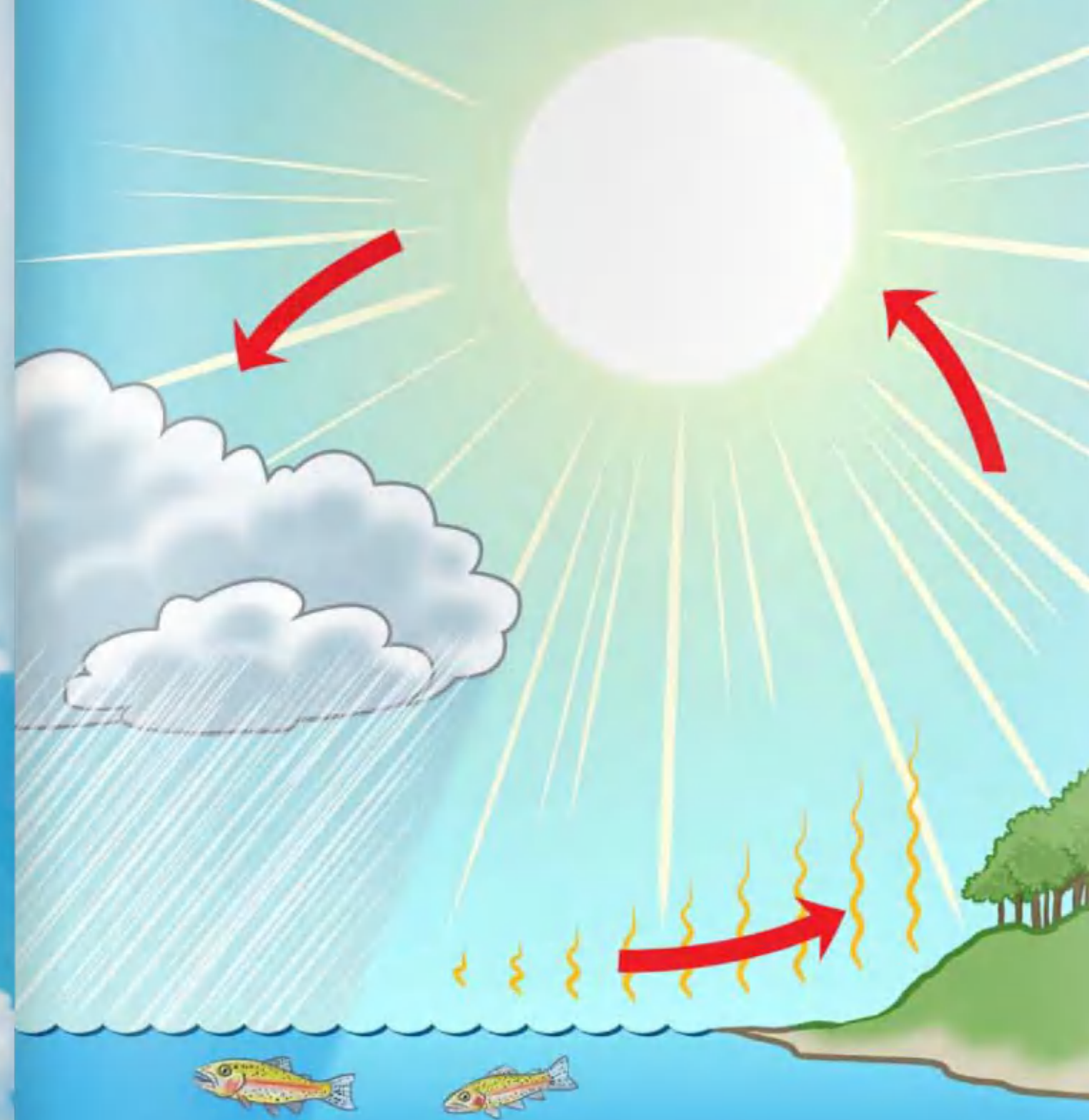
# Clouds Are Made of Water

Clouds are made up of millions of tiny drops of water. The drops are so tiny and so light that they float in the air. The tiny drops clump together and form a cloud.

How do water drops get in the sky? When water gets warm enough, it changes into a gas called *water vapor*. When a puddle dries up on a hot, sunny day, it is because the water is turning into water vapor. That is called *evaporation*.



**Microscopic  
drops of water**

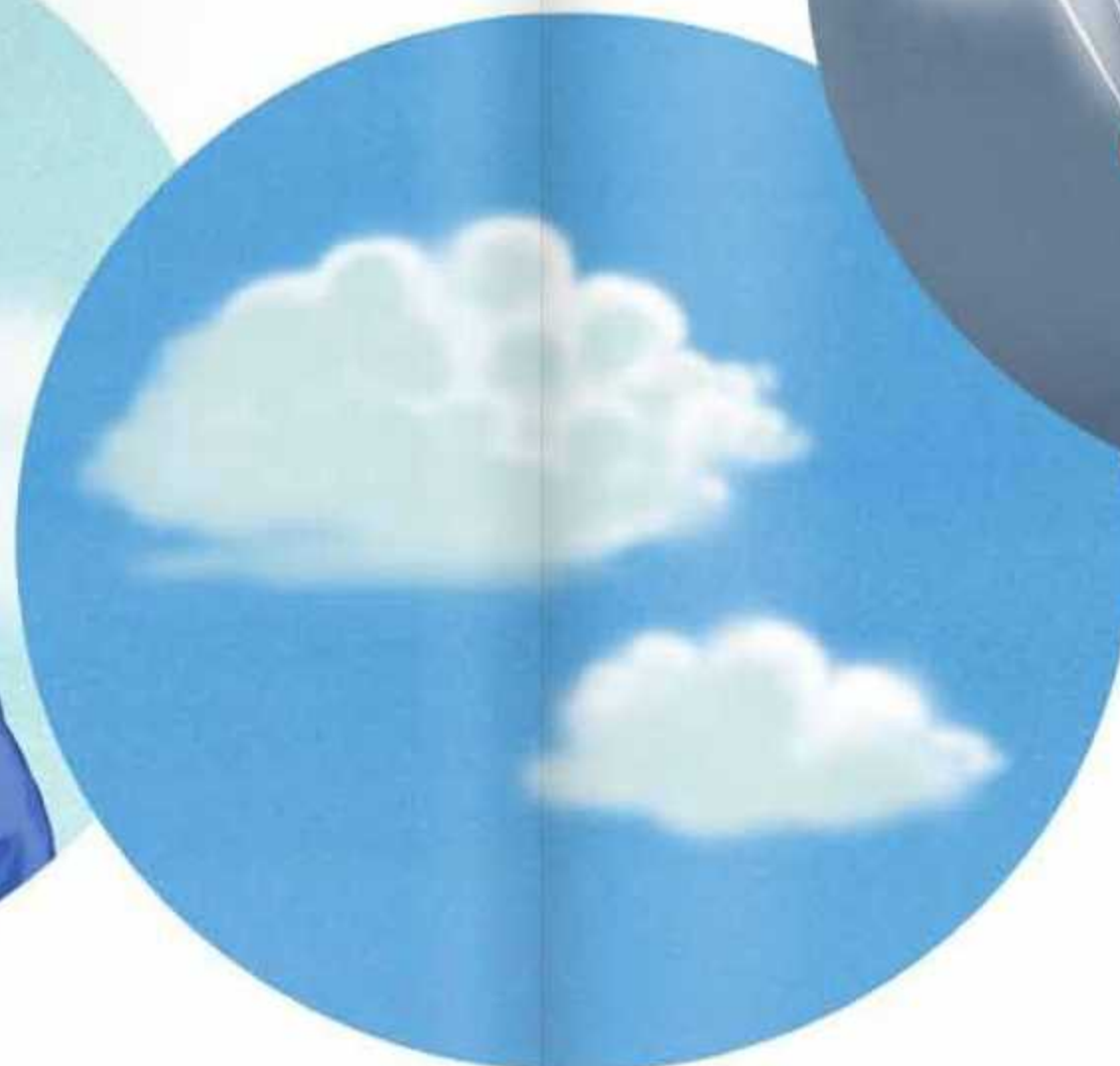


Water vapor is invisible—you can't see it. Water vapor is lighter than air, so it floats up into the sky.



When water vapor gets cold, it changes back into water. That is called *condensation*.

That is why you can see your breath on a cold day. The warm water vapor in your breath gets cold and changes into a little mist of water droplets.



When you see steam coming out of a teakettle, that is water vapor cooling and turning into water drops.

When water vapor hits cold air in the sky, it changes into water droplets and forms clouds.



# The Water Cycle

All water on Earth is part of a giant *water cycle*.

The diagram illustrates the water cycle with the following components and processes:

- Sun:** The source of energy for the cycle.
- Wind:** Shown as a red arrow moving from the sea towards the clouds.
- Evaporation:** Red arrows show water rising from the **Lakes** and **Sea** into the air.
- Trees:** Red arrows show water evaporating from the leaves of trees.
- Clouds:** Two clouds are shown. One is labeled **Cloud** and the other **Cloud**.
- Rain:** A red arrow shows rain falling from a cloud onto a grassy area.
- Snow:** A red arrow shows snow falling from a cloud onto a mountain peak.
- Ground Run-off:** A red arrow shows water flowing from the mountain down a slope.
- Underground Water:** A red arrow shows water flowing underground towards a river.
- River:** A blue river flows through the landscape.
- Lakes:** A blue lake is situated near the trees.
- Sea:** A large body of water on the right side of the diagram.

Water evaporates from streams, lakes and the oceans. The water vapor goes up into the air and forms clouds. When the water drops in the clouds become too heavy, it rains or snows. The water comes back to earth. This cycle never stops.

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## Evaporation

## Trees

## Lakes

## Sea

## Rain

## Cloud

## Snow

## Underground Water

## River

## Ground Run-off



# What Makes It Rain?

Clouds can hold lots and lots of water and water vapor. But sometimes they just can't hold any more.

If there are too many droplets of water in a cloud, they begin to bump into each other. The little droplets join together and become bigger drops. Those bigger drops fall to earth as rain.

Rain brings us the water that we need for so many things. Rain fills our rivers and lakes. Rain gives us fresh water to drink. Rain brings farmers the water they need for their crops.

Close-up of  
rain drops





# What Makes It Snow?



When the air in a cloud is freezing cold, the water droplets turn to ice crystals. As the ice crystals fall to the ground, water vapor freezes onto them. They become snowflakes.

Snowflakes come in many different shapes.

When snow on the ground melts, it ends up in our rivers and streams. Snow is another important source of water for drinking, for growing things and for filling our rivers, lakes and oceans.





# What Makes It Hail?



Sometimes round beads of ice fall to the ground from clouds. This is called *hail*. Hail can be tiny round pellets or larger than baseballs. Even though hail is made of ice, it often falls in summer thunderstorms, not during winter.

Hail forms inside big storm clouds that stretch high into the icy-cold sky. The inside of the storm cloud is very windy. Icy hailstones blow up and down inside the cloud until they tumble and rattle to earth.

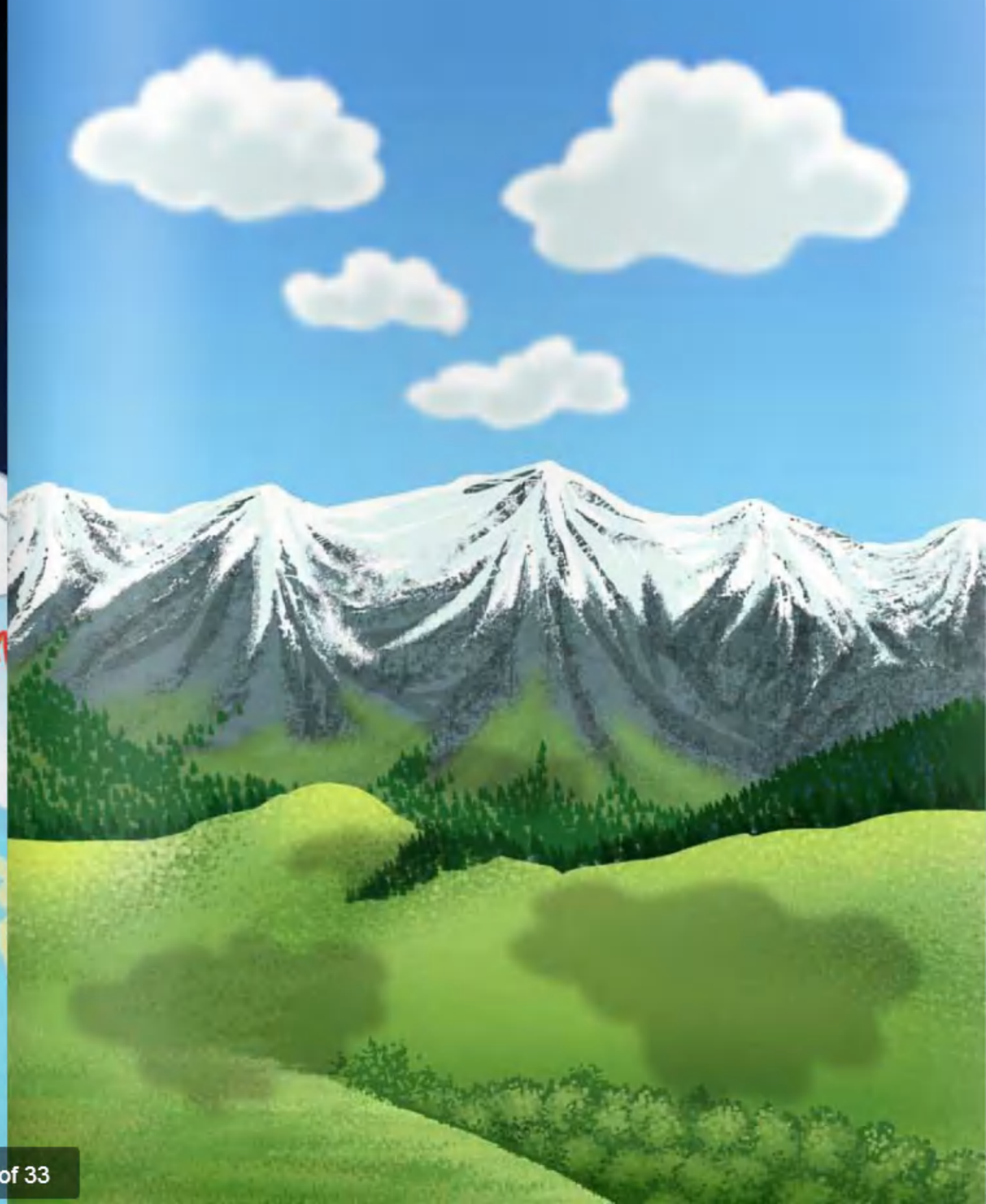


# Clouds Protect Us

Besides bringing rain and snow, clouds also protect us. During the day clouds shade us like an umbrella from the worst heat of the sun. (Although some sunlight still comes through.)



At night clouds act like a blanket. They trap warm air near the Earth and keep the heat from escaping into space.





# Types of Clouds

There are different types of clouds. If you know the types of clouds, you can sometimes predict the weather.

## The High-cloud Zone:

3.7 to 56 miles

cirrus clouds



## The Middle-cloud Zone:

6,500 feet to 19,685 feet

cumulus clouds



## The Low-cloud Zone:

up to 6,500 feet

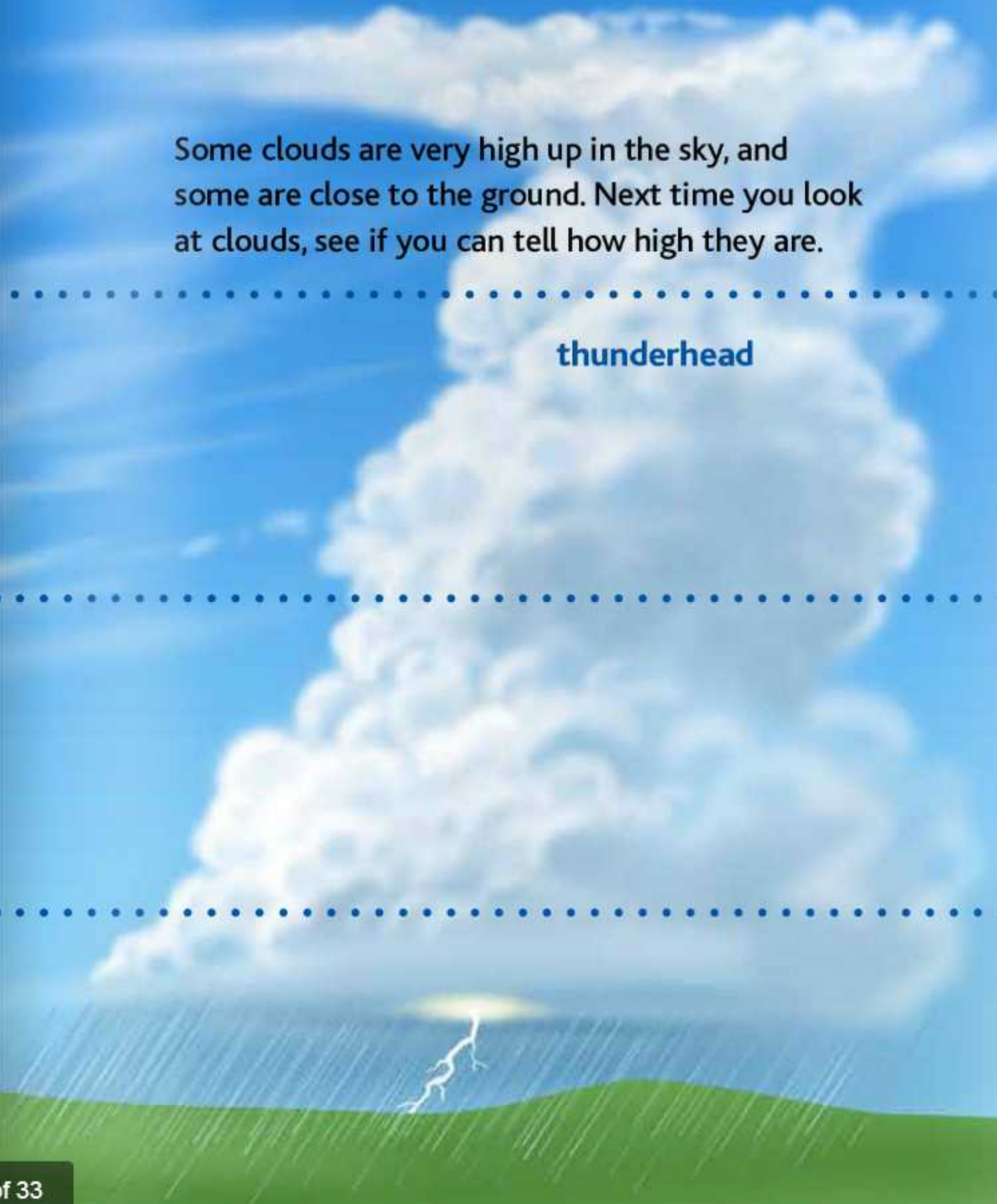
stratus clouds

fog



Some clouds are very high up in the sky, and some are close to the ground. Next time you look at clouds, see if you can tell how high they are.

thunderhead







# Cumulus Clouds

On these pages you will see some common types of clouds. See if you can learn to recognize them in the sky.

Cumulus (KYUME-you-lus) clouds look like puffy, white cotton balls. These clouds are usually lower in the sky. They have flat bottoms and round tops. You can see blue sky between these clouds. They are often a sign of good weather.



# Stratus Clouds



Stratus (STRAT-us) clouds are gloomy-looking low clouds. They look like a gray blanket across the sky. They may hide the sun from view.

If you see the sky filling up with dark-colored stratus clouds, be sure to keep your umbrella and boots near. Heavy rain or snow is heading your way.



# Cirrus Clouds

Cirrus (SEAR-us) clouds are high in the sky. They are thin and wispy. Some look like feathers or fish scales or horses' tails. Cirrus clouds are made of ice crystals because the air where they float is very cold.

Cirrus clouds can mean that the weather is about to change and rain is coming.



# Thunderheads

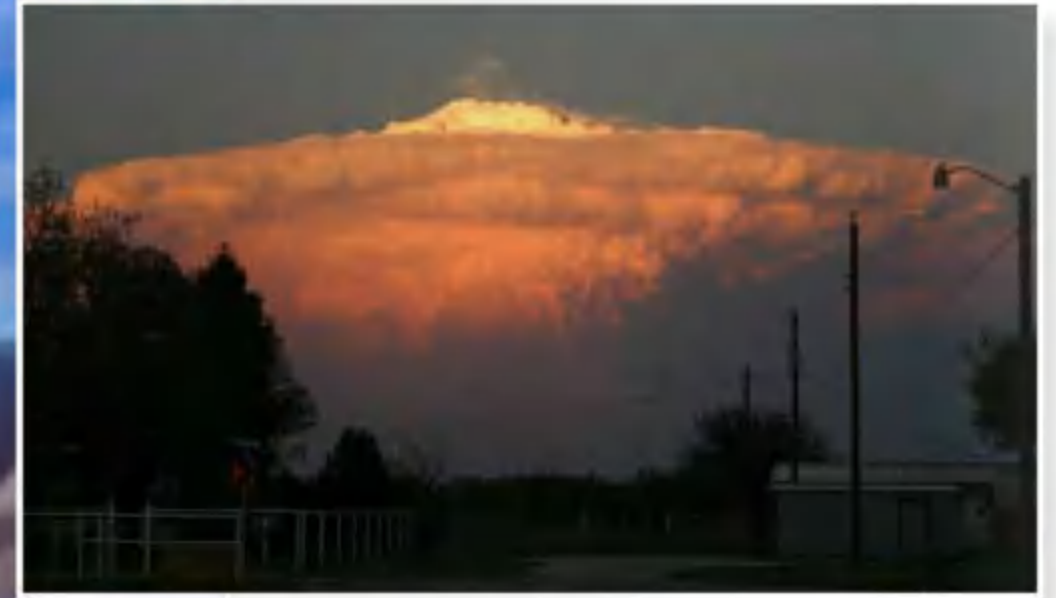
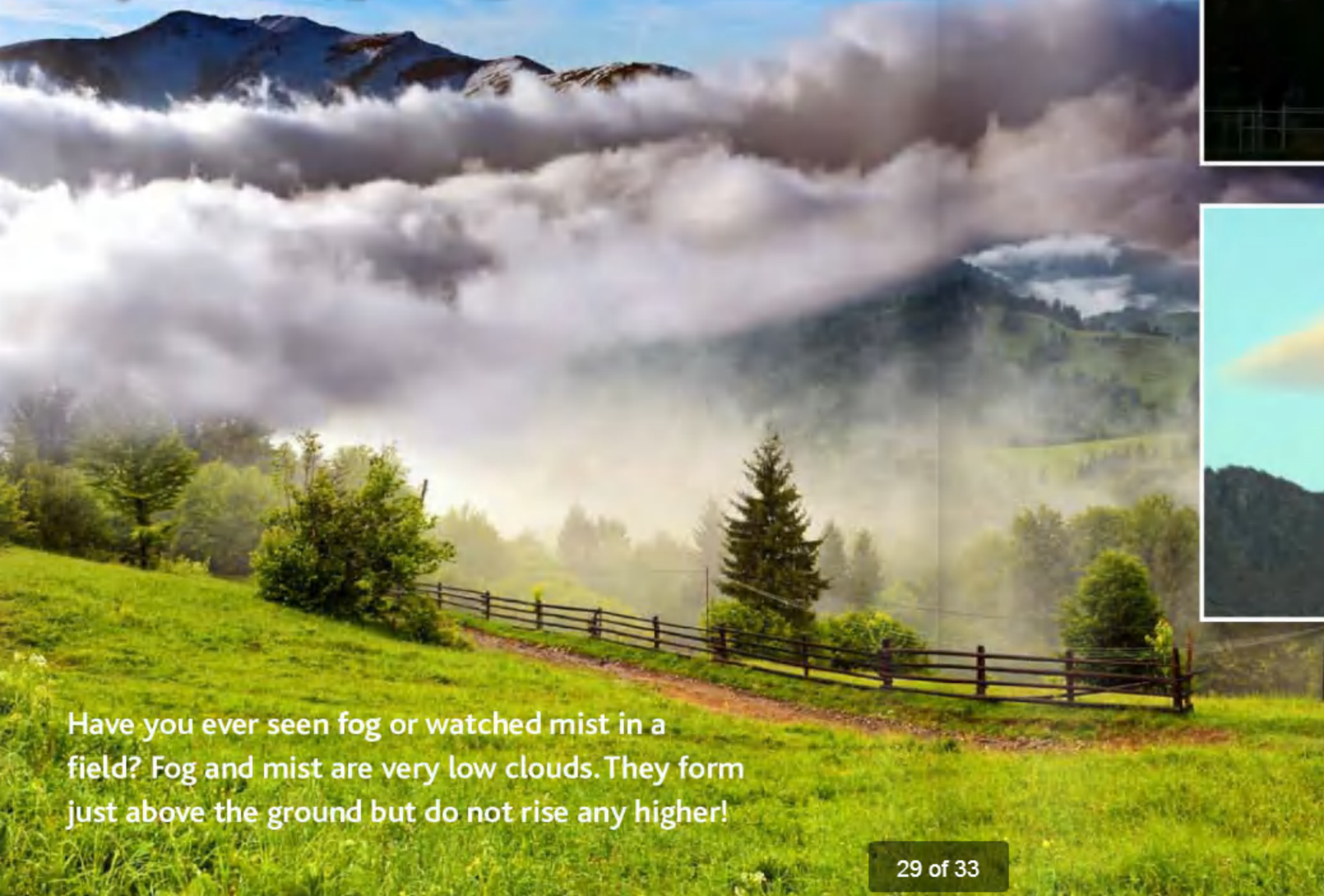
Towering thunderheads are tall, often dark clouds that are flat across the top. They can come one at a time or as several stretched out in a wall of clouds.

Thunderheads often bring heavy rains with thunder and lightning and strong winds. In a very powerful thunderstorm, the winds can start to spin rapidly and form a tornado.





# Many Types of Clouds



Have you ever seen fog or watched mist in a field? Fog and mist are very low clouds. They form just above the ground but do not rise any higher!

Clouds can be strange shapes. Are these flying saucers? Are they balloons? No. They are just clouds.



The next time you are looking at a cloud, remember that you are looking at water in the sky. Clouds are very helpful. We can predict the weather by looking carefully at them. They help keep us warm and cool. They help farmers grow food and give us water to drink. All that from some soft, puffy-looking clouds!





# GLOSSARY

**Cirrus** – a thin, wispy high cloud made of ice crystals.

**Condensation** – when a gas or vapor cools and changes to a liquid.

**Cumulus** – a low, puffy cloud made of water droplets.

**Evaporation** – the way a liquid changes to a gas or vapor.

**Fog** – a thick cloud that floats close to the ground.

**Hail** – rain that has frozen inside clouds into hard balls of ice.

**Mist** – condensed water vapor.

**Stratus** – a type of flat, gray, low cloud.

**Thunderhead** – a large cumulus cloud that can turn into a thunderstorm.

**Tornado** – a spinning storm with very strong winds.

**Water cycle** – the round-trip that water takes from the ground to the sky and back again.

**Water vapor** – invisible gas that forms when water evaporates.

Have you ever watched clouds as they float across the sky? Some clouds are white and puffy. Some are gray and flat. They are fun to watch—but what are clouds? Are they full of water? How does the water get up in the sky?

What makes it rain? You can find out in

***Clouds: What Are They?***

